

1           1.       In an entertainment system that is capable of playing back stored video data,  
2 wherein the video data is characterized by parameters that vary as a function of time within  
3 the video data, a method of skipping the playback of video data to a location selected to  
4 approximate a segment transition between segments of the video data, the method  
5 comprising the acts of:

6                   playing back stored video data, wherein the video data includes information  
7 identifying positions in the video data that are candidates for segment transitions,  
8 the candidates for segment transitions having been identified based on a  
9 comparison of values representing the change of the value of a parameter of the  
10 video data at a plurality of positions in the video data;

11                   skipping the playback of the video data to a location in the video data  
12 designated to approximate a segment transition between segments of the video  
13 data, by performing the acts of:

14                   selecting one of the candidates for segment transitions as the  
15 location to which the playback is to be skipped; and

16                   skipping the playback to the selected location and resuming playing  
17 back of video data from the selected location.

18  
19           2.       A method as defined in claim 1, further comprising, prior to the act of  
20 playing back the stored video data, the act of identifying the positions in the video data that  
21 are candidates for segment transitions by quantifying the rate of change in the value of the  
22 parameter of the video data at the plurality of positions in the video data.  
23  
24

1           3.       A method as defined in claim 2, wherein the act of quantifying the change  
2 in the value of a parameter of the video data includes performing, for each of the plurality  
3 of positions, the acts of:

4                   calculating a preceding local average value of the parameter in a portion of  
5 the video data preceding the position;

6                   calculating a following local average value of the parameter in a portion of  
7 the video data following the position; and

8                   generating a local average difference value by calculating the absolute value  
9 of the difference between the preceding local average value and the following local  
10 average value.

11  
12           4.       A method as defined in claim 3, wherein positions having a locally maximal  
13 local average difference value are identified as being candidates for segment transitions.

14  
15           5.       A method as defined in claim 1, wherein the information identifying  
16 positions in the video data that are candidates for segment transitions comprises transition  
17 tags inserted into the video data at the positions that are candidates for segment transitions,  
18 the transition tags having been inserted by the entertainment system after the entertainment  
19 system receives the video data.

20  
21           6.       A method as defined in claim 1, wherein the information identifying  
22 positions in the video data that are candidates for segment transitions has been inserted into  
23 the video data by an encoder prior to the entertainment system receiving the video data, the  
24 information having been inserted into the video data by the encoder performing the acts of:

1 calculating a preceding local average value of the parameter in a portion of  
2 the video data preceding the position;

3 calculating a following local average value of the parameter in a portion of  
4 the video data following the position;

5 generating a local average difference by calculating the absolute value of  
6 the difference between the preceding local average value and the following local  
7 average value; and

8 inserting information relating to the local average difference into the video  
9 data.

10  
11 7. A method as defined in claim 1, wherein the act of selecting one of the  
12 candidates for segment transitions comprises the acts of:

13 at each of a plurality of positions that are candidates for segment transitions,  
14 multiplying the value representing the rate of change of the value of the parameter  
15 at the position with a corresponding value selected from a weighting curve, the  
16 shape and position of the weighting curve being selected to favor the selection of a  
17 candidate for segment transition that is positioned at a default skip length from a  
18 current playback position in the video data to generate a product value associated  
19 with the position; and

20 selecting the position having the greatest associated product value.

21  
22 8. A method as defined in claim 7, wherein the weighing curve defines a  
23 Gaussian distribution having an apex at the default skip length.

1           9.     A method as defined in claim 1, further comprising the act of receiving  
2 input from a user requesting the playback to be skipped, the act of skipping the playback of  
3 the video data being initiated in response to the act of receiving input.  
4

5           10.    A method as defined in claim 1, wherein the candidates for segment  
6 transitions have been identified based on a comparison of values representing the change  
7 of the value of multiple parameters of the video data at a plurality of positions in the video  
8 data  
9

10          11.    A method as defined in claim 1, wherein the parameter is selected from a  
11 group of parameters consisting of:

12               frame size;

13               luminance of an image encoded in the video data; and

14               overall quantization scale used to encode the color of the image.  
15

16          12.    A method as defined in claim 1, wherein:

17               the video data is encoded using a compression format that uses interframe  
18 decoding and includes periodic intraframes used in interframe decoding; and

19               the parameter represents a frequency of the intraframes in the video data.  
20

21          13.    A method as defined in claim 1, further comprising the act of receiving and  
22 storing the video data at the entertainment system for later playback of the video data.  
23  
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1           14.     In an entertainment system that is capable of playing back stored video data,  
2 wherein the video data is characterized by parameters that vary as a function of time within  
3 the video data, a method of skipping the playback of video data to a location selected to  
4 approximate a segment transition between segments of the video data, the method  
5 comprising the acts of:

6                     storing video data that has been received by the entertainment system;

7                     calculating values representing the rate of change of the value of a  
8 parameter of the video data at a plurality of positions in the video data;

9                     identifying positions in the video data that are candidates for segment  
10 transitions by comparing the values representing the change of the value of the  
11 parameter at a plurality of positions in the video data;

12                     storing with the video data the segment transition candidates;

13                     playing back the video data;

14                     receiving input from a user requesting that the playback be skipped to a  
15 segment transition between segments of the video data;

16                     in response to the input, selecting one of the candidates for segment  
17 transitions as the location to which the playback is to be skipped; and

18                     skipping the playback to the selected location and resuming playing back of  
19 video data from the selected location.

20  
21           15.     A method as defined in claim 14, wherein the act of selecting one of the  
22 candidates comprises the acts of:

23                     at each of a plurality of candidate positions in the video data, multiplying  
24 the value representing the change of the value of the parameter at the position with

1 a corresponding value selected from a weighting curve, the shape and position of  
2 the weighting curve being selected to favor the selection of a candidate for segment  
3 transition that is positioned at a default skip length from a current playback position  
4 in the video data to generate a product value associated with the position; and  
5 selecting the position having the greatest associated product value.  
6

7 16. A method as defined in claim 15, wherein the default skip length is thirty  
8 seconds.  
9

10 17. A method as defined in claim 15, wherein candidate positions that fall at  
11 locations in the weighting curve at which the weighting curve has value 0 are not  
12 considered or multiplied by the weighting curve.  
13

14 18. A method as defined in claim 15, wherein the act of identifying segment  
15 transition candidates comprises the act of generating the candidates, including the acts of:

16 calculating a preceding local average value of the parameter in a portion of  
17 the video data preceding the position;

18 calculating a following local average value of the parameter in a portion of  
19 the video data following the position; and

20 generating a local average difference by calculating the absolute value of  
21 the difference between the preceding local average value and the following local  
22 average value.  
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1           19.     A method as defined in claim 18, wherein the act of identifying positions in  
2 the video data that are candidates for segment transitions comprises the act of identifying  
3 positions having a local average difference that is a local maximum.  
4

5           20.     A method as recited in claim 15, wherein the act of storing values  
6 representing the change of the value of a parameter of the video data at a plurality of  
7 positions in the video data comprises the act of receiving the stored values with the video  
8 data, the values having been generated by an encoder of the video data performing the acts  
9 of:

10                     calculating a preceding local average value of the parameter in a portion of  
11 the video data preceding the position;

12                     calculating a following local average value of the parameter in a portion of  
13 the video data following the position; and

14                     generating a local average difference by calculating the absolute value of  
15 the difference between the preceding local average value and the following local  
16 average value.  
17

1           21. In a video encoder that encodes video data in a compressed format in  
2 preparation for transmitting the video data to an entertainment system, wherein the  
3 encoded video data is characterized by parameters that vary as a function of time within  
4 the video data, a method of supplementing the video data with information identifying  
5 candidates for segment transitions between segments of the video data, the method  
6 comprising:

7                     encoding the video data in the compressed format;

8                     including, with the video data, information representing the change in the  
9 value of a parameter by performing the acts of:

10                    calculating a preceding local average value of the parameter in a  
11 portion of the video data preceding the position;

12                    calculating a following local average value of the parameter in a  
13 portion of the video data following the position;

14                    generating a local average difference by calculating the absolute  
15 value of the difference between the preceding local average value and the  
16 following local average value; and

17                    inserting information relating to the local average difference into the  
18 video data; and

19                    transmitting the video data and the information representing the change in  
20 the value of the parameter to a decoder included in an entertainment system such  
21 that the entertainment system can skip playback of the video data to a segment  
22 transition in the video data.



1           22.     A method as defined in claim 21, wherein the parameter is selected from a  
2 group of parameters consisting of:

3                 frame size;

4                 luminance of an image encoded in the video data; and

5                 overall quantization scale used to encode the color of the image.  
6

7           23.     A method as defined in claim 21, wherein:

8                 the video data is encoded using a compression format that uses interframe  
9 decoding and includes periodic intraframes used in interframe decoding; and

10                the parameter represents a frequency of the intraframes in the video data.  
11

12           24.     A method as defined in claim 21, wherein the act of identifying positions in  
13 the video data that are candidates for segment transitions comprises the act of comparing  
14 values representing the change in the values of multiple parameters of the video data,  
15 including performing, for each of the multiple parameters, the acts of:

16                calculating a preceding local average value of the parameter in a portion of  
17 the video data preceding the position;

18                calculating a following local average value of the parameter in a portion of  
19 the video data following the position;

20                generating a local average difference value by calculating the absolute value  
21 of the difference between the preceding local average value and the following local  
22 average value; and

23                identifying local maxima in the local average difference values over time.  
24

1           25.     A computer program product for implementing, in an entertainment system  
2 that is capable of playing back stored video data, wherein the video data is characterized by  
3 parameters that vary as a function of time within the video data, a method of skipping the  
4 playback of video data to a location selected to approximate a segment transition between  
5 segments of the video data, the computer program product comprising:

6                     executable instructions for implementing the method, the executable  
7 instructions, when executed, causing the entertainment system to perform the acts  
8 of:

9                     storing video data that has been received by the entertainment  
10 system;

11                    calculating values representing the rate of change of the value of a  
12 parameter of the video data at a plurality of positions in the video data;

13                    identifying positions in the video data that are candidates for  
14 segment transitions by comparing the values representing the change of the  
15 value of the parameter at a plurality of positions in the video data;

16                    storing with the video data the segment transition candidates;

17                    playing back the video data;

18                    receiving input from a user requesting that the playback be skipped  
19 to a segment transition between segments of the video data;

20                    in response to the input, selecting one of the candidates for segment  
21 transitions as the location to which the playback is to be skipped; and

22                    skipping the playback to the selected location and resuming playing  
23 back of video data from the selected location.  
24

1           26.     A computer program product as recited in claim 25, wherein the act of  
2 selecting one of the candidates comprises the acts of:

3                     at each of a plurality of candidate positions in the video data, multiplying  
4 the value representing the change of the value of the parameter at the position with  
5 a corresponding value selected from a weighting curve, the shape and position of  
6 the weighting curve being selected to favor the selection of a candidate for segment  
7 transition that is positioned at a default skip length from a current playback position  
8 in the video data to generate a product value associated with the position; and

9                     selecting the position having the greatest associated product value.

10  
11           27.     A computer program product as defined in claim 26, wherein the weighing  
12 curve defines a Gaussian distribution having an apex at the default skip length.

13  
14           28.     A computer program product as defined in claim 25, wherein the act of  
15 storing values representing the change of the value of a parameter of the video data at a  
16 plurality of positions in the video data comprises the act of generating the stored values,  
17 including the acts of:

18                     calculating a preceding local average value of the parameter in a portion of  
19 the video data preceding the position;

20                     calculating a following local average value of the parameter in a portion of  
21 the video data following the position; and

22                     generating a local average difference by calculating the absolute value of  
23 the difference between the preceding local average value and the following local  
24 average value.